H. C. BARNES.

MACHINE FOR GRINDING TAPER ROLLS.

APPLICATION FILED JUNE 28, 1912. RENEWED JULY 10, 1914.

1,128,091.

Patented Feb. 9, 1915.

3 SHEETS—SHEET 1.

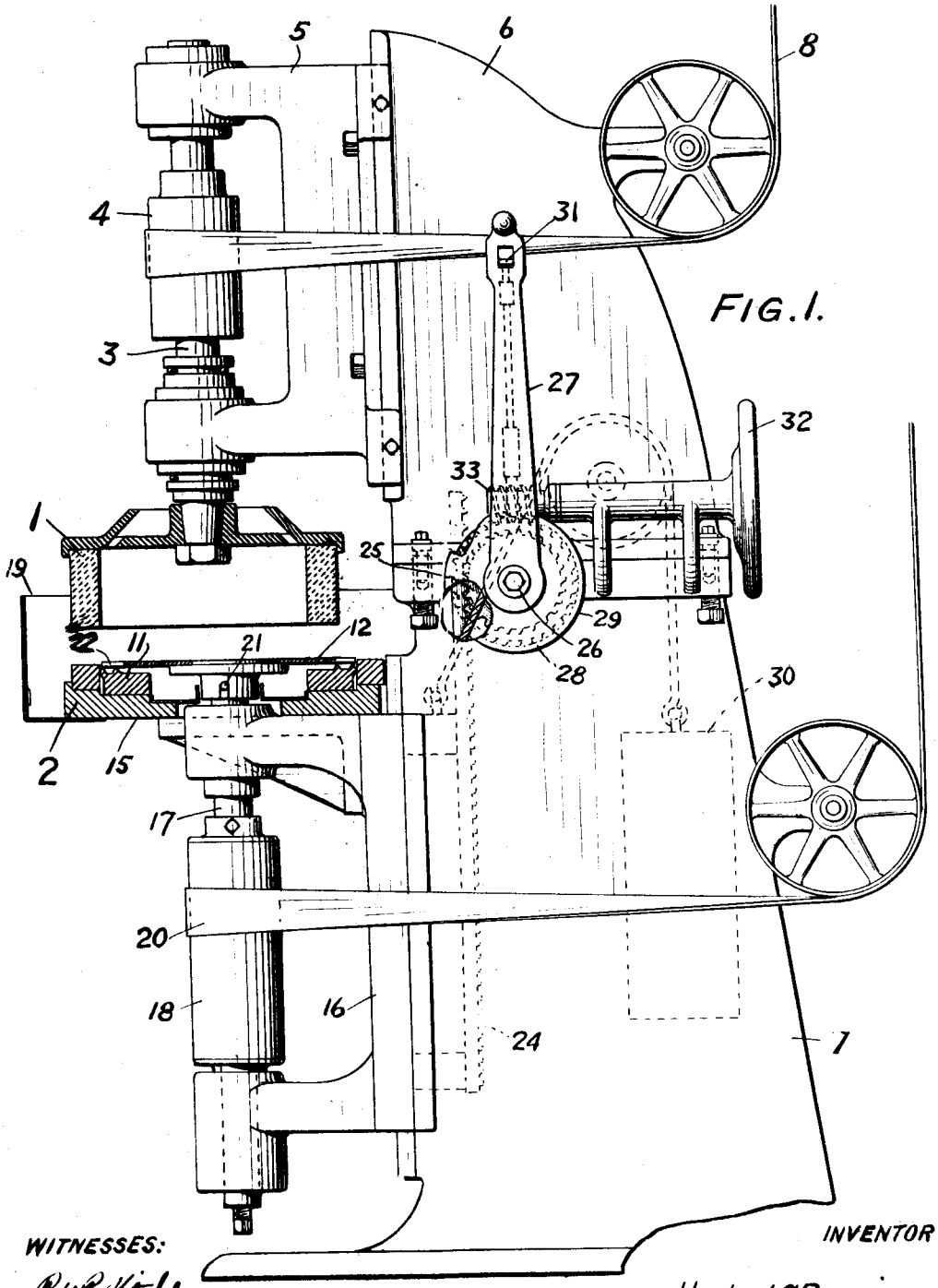


FIG. 1.

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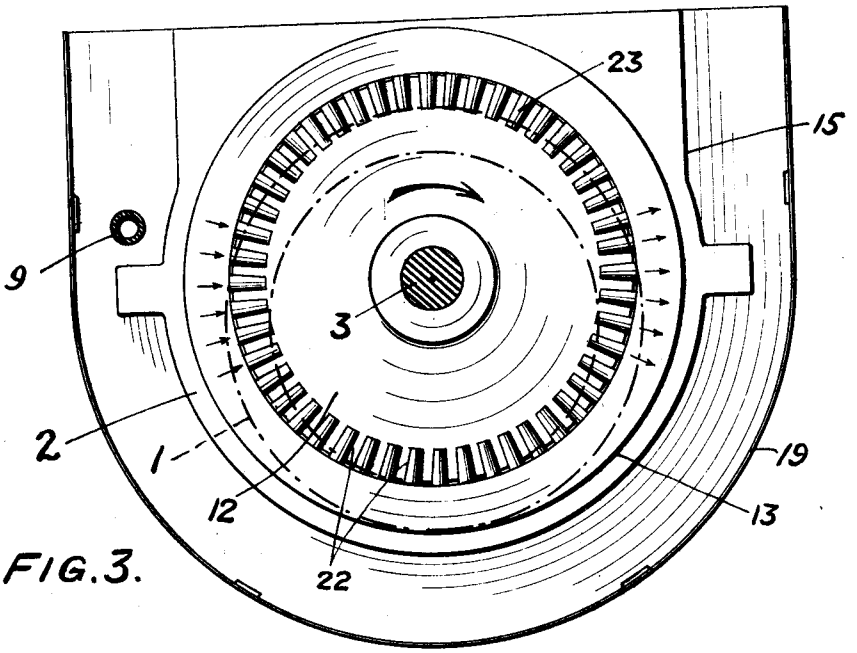


FIG. 3.

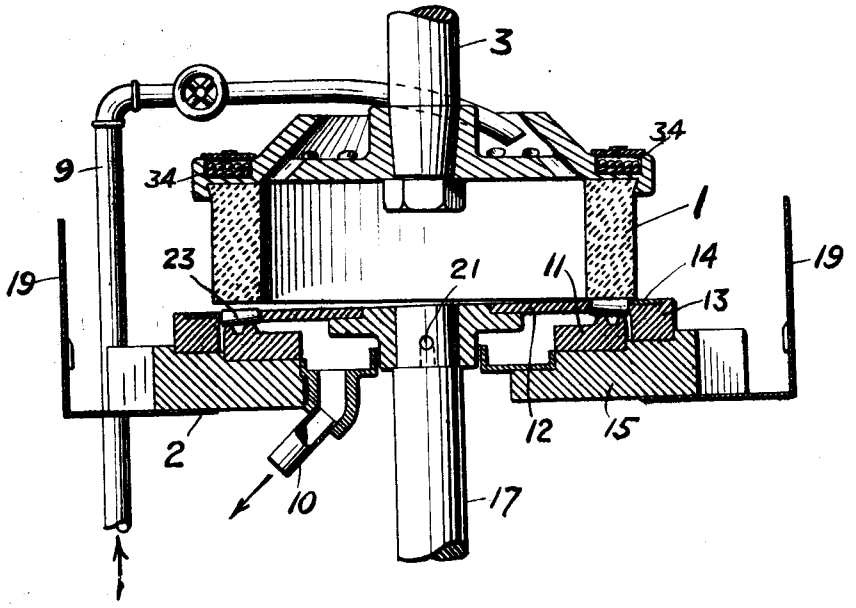


FIG. 2.

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3 SHEETS—SHEET 3.

FIG. 7.

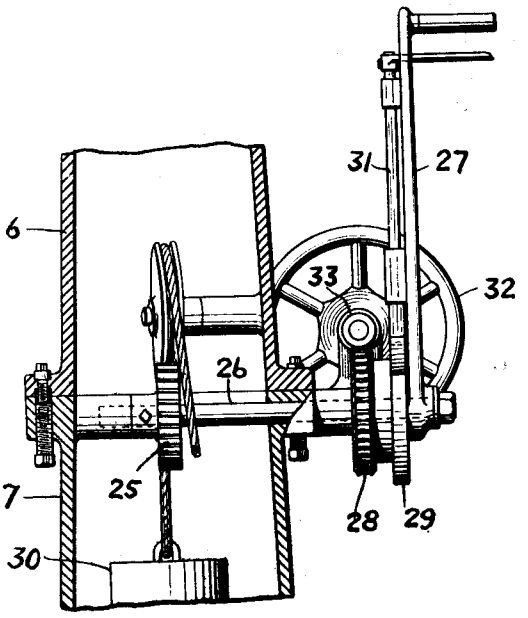


FIG. 6.

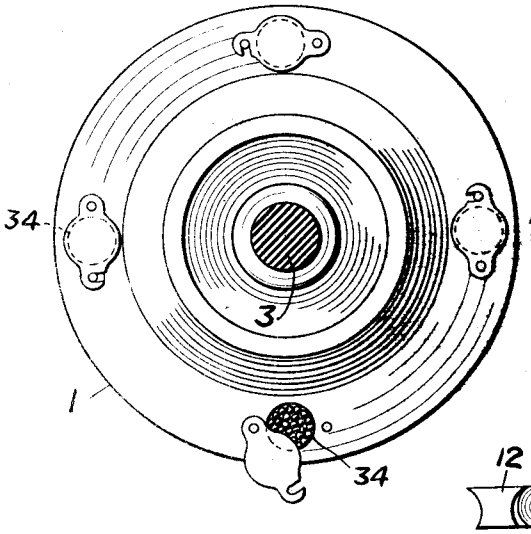
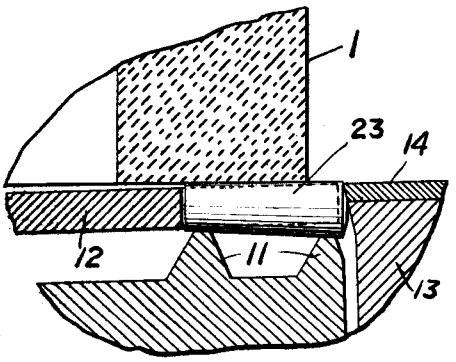


FIG. 4.



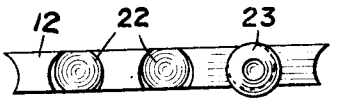


FIG. 5.

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UNITED STATES PATENT OFFICE.

HERBERT C. BARNES, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO STANDARD ROLLER BEARING COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF NEW JERSEY.

MACHINE FOR GRINDING TAPER ROLLS.

1,128,091. Specification of Letters Patent. Patented Feb. 9, 1915.

Application filed June 28, 1912, Serial No. 706,501. Renewed July 10, 1914. Serial No. 850,261.

To all whom it may concern:

Be it known that I, HERBERT C. BARNES, a citizen of the United States, residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a certain new and useful Machine for Grinding Taper Rolls, of which the following is a specification.

The principal objects of the present invention are to provide for accurately, rapidly and comparatively inexpensively grinding the conical surfaces of taper rolls; to obviate the necessity of centering the rolls one at a time or individually; to grind the rolls with respect to the conditions under which they are to operate in practice; to provide for rapidly and conveniently feeding and removing groups of rolls to and from the machine; and to provide for presenting the grinding face of the grinding wheel and the conical surfaces of the rollers to each other in proper relation for insuring accuracy and uniformity of the finished rolls.

The invention will be claimed at the end hereof but will first be described in connection with the embodiment selected from other embodiments of it for illustration in the accompanying drawings in which—

Figure 1, is a side view of a machine embodying features of the invention with parts broken away and in section. Fig. 2, is a sectional view taken at right angles to the section of Fig. 1, drawn to an enlarged scale and illustrating the working parts of the machine. Fig. 3, is a top or plan view of the roller holder showing in dotted lines the rim of the grinder. Fig. 4, is a sectional view drawn to an enlarged scale and taken generally at the right-hand side of Fig. 3. Fig. 5, is an edge view of a part of the roller spacing carrier. Fig. 6, is a top or plan view of the grinder, and Fig. 7, is an end view with parts broken away showing some of the gearing.

In the drawings 1, is a grinder and 2, is a roller holder. Each of these is rotated, the grinder at high speed and the holder at low speed. These parts are eccentric and are disposed at an inclination to each other as shown in Fig. 2. The grinder 1, illustrated in the drawings is an annulus depending from and carried by a spindle 3, provided with a driving pulley 4, and rotatably mounted in bearings carried by the bracket 5, adjustably bolted to the top section 6, which in its turn is adjustably bolted to the base section 7.

8, is a belt for driving the grinder 1. For the purpose of lubrication or wetting connections 9 and 10, may be provided along with a guard or casing 19, for preventing splashing.

The roller holder illustrated in the drawings comprises a track or roller race 11, and roller spacing carrier 12, and a guide or retaining ring 13, shown as fitted with a hardened working edge 14. The parts 11 and 13, are carried by a base 15, fast on a bracket 16, having vertical motion in ways on the base section 7. The part 12, is detachably mounted upon the upper end of a spindle 17, provided with a pulley 18, and mounted in bearings on the bracket 16. The lower end of the shaft 17, or the adjustable screw projecting from it may collide with and rest upon the base of the machine or upon the ground.

20, is a belt for driving the shaft 17, and the roller spacing carrier 11, at comparatively low speed and in the present instance in the same direction as the grinder 1. The part 12, by means of the slot-and-pin connection 21, may be lifted off and applied to the shaft 17, but rotates with it.

The pockets 22, in the roller spacing carrier 12, are generally conical and extend through the rim of the part 12, and at the opposite faces of that part they are open so that a conical roller blank 23, can be inserted radially into each of these pockets and when in that position the blank can run on the track 11, and be exposed above the part 12, to receive the action of the grinder. The guide 14, is presented to the faces of the larger ends of the rollers or roller blanks.

The rack 24, on the bracket 16, meshes with a pinion 25, fast to the shaft 26. The crank 27, is also fast to the shaft 26. The worm wheel 28, and the notched wheel 29, are fast to each other but loose on the shaft 26.

30, is a counterweight for balancing the bracket 16. By disengaging the hand latch 31, the handle 27, can be turned so as to quickly raise and lower the bracket 16, and through the intervention of the rack and

pinion 24 and 25, and when the hand latch 31, secured to the hand lever 27, engages the notched wheel 29, the shaft 26, can be slowly rotated by the hand wheel 32, which is provided with a worm 33, that meshes with the worm wheel 28, thus slowly lifting the bracket 16, and parts carried thereby to feed in respect to the grinder 1.

In use the bracket 16, may be lowered in the manner described, the end of the shaft 17, strikes upon the base or ground, and the other parts descend from it, so that the roller spacing carrier 12, is at a higher level than the parts 11, 13 and 15, and all of these parts are clear of the grinder 1. A roller spacing carrier filled with roller blanks may be made to replace the carrier containing the finished rolls if one had previously been used in the machine. The spindle 17, is raised rapidly, if desired, by the handle 27, and then the more gradual feeding may be effected by turning the hand wheel 32. Inasmuch as the spindles 3 and 17, are eccentric the path of the grinder is substantially as illustrated by dotted lines in Fig. 3, and inasmuch as the spindle 3, is not vertical but is inclined, the grinder operates on the rollers to one side of the center and theoretically may be said to operate upon only one roller at a time. This is indicated at the righthand side in Figs. 2 and 3. The roller spacing carrier of course slowly revolves so that the rollers which it carries are ground in succession. The described action tends to push the rollers outward where they are being ground but such tendency to outward movement is opposed by the guide 14, upon which the end, the larger end, of each roller abuts as it is being ground. The result of this is that in grinding the position of the roller is referred to its larger end and in a taper roller bearing this same thing occurs. During the grinding operation suitable lubricating or cooling liquid may run through the connections 9 and 10, and at the completion of the operation the bracket 16, is again lowered and the described procedure repeated. It will be understood that when the roller spacing carrier 12, is handled the rollers or roller blanks are carried by it.

34, are pockets in the carrier of the grinder and weight, as shot, may be added to or taken from them to balance the grinder which rotates at a high speed. Inasmuch as the face of the grinder is not horizontal but is inclined, it follows that the race 11, must hold the rollers in such position that their conical surfaces are at the same inclination, or in other words, parallelism between the face of the grinder and the conical surface of the rollers at the place where the grinding is done must be maintained. At other parts of the circle the grinding face runs above and clear of the rollers. Generally speaking, the parts which make up the roller race 11, on which the rollers run are in certain planes of which, as shown, the inner one is higher than the outer one, whereas the face of the grinder is in a plane in parallel with but inclined in respect to the first mentioned planes.

It will be obvious that modifications may be made and I therefore do not desire to limit my invention to the precise arrangement shown and described, but

Having thus explained my invention what I desire to secure by Letters Patent and claim is:

1. A grinder for taper rollers comprising the combination of an annular race having a roller-end thrust guide and in which taper rollers may revolve with portions of their conical surfaces exposed, a grinder having its face parallel with the exposed conical surface of a roller at one point in the race and inclined in respect to the race, and means for revolving the grinder in eccentric relation to the race, substantially as described.

2. A grinder for taper rollers comprising the combination of a race having a roller end thrust guide and in which rollers may roll with portions of their conical surfaces exposed, a grinder having its working face parallel with the exposed conical surface of a roller at one point in the race, and means for revolving the grinder across the exposed surface of successive rollers, substantially as described.

3. A grinder for taper rollers comprising the combination of an annular race having a peripheral guide-ring and in which taper rollers may revolve with portions of their conical surfaces exposed, a roller-spacing-carrier concentric with the race, a grinder having its face parallel with the exposed surface of a roller at one point in the race, and means for revolving the grinder and carrier in eccentric relation, substantially as described.

In testimony whereof I have hereunto signed my name.

HERBERT C. BARNES.

Witnesses:
D. S. WOODWARD,
J. T. O'NEILL.